This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-44. (canceled)

45. (previously presented) A laser comprising:

a laser-resonator including an output coupling mirror;

an OPS-structure having a surface-emitting gain-structure, said gain-structure including a plurality of active layers having separator layers therebetween said active layers having a composition selected to provide emission of electromagnetic radiation at a fundamental wavelength within a gain bandwidth of said gain-structure, when optical-pump light is incident on said gain-structure;

said OPS structure being supported on a substrate located outside said laser-resonator with said gain-structure of said OPS-structure being inside said laser resonator;

a heat-sink arrangement for cooling said OPS-structure; and

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to oscillate in said laser-resonator; and

an optically-nonlinear crystal located in said laser-resonator and arranged for frequency-doubling said fundamental laser-radiation thereby providing frequency-doubled radiation having a wavelength half of said fundamental-wavelength, with the frequency-doubled radiation exiting the cavity through the output coupling mirror is greater than about 100mw.

46. (previously presented) The laser of claim 45, wherein said pump light is directed to said gain structure at a non-normal angle of incidence.

47. (previously presented) The laser of claim 45, wherein said output coupler is has a concave surface.

48. (previously presented) The laser of claim 45, wherein the radiation exiting the cavity has a mode quality of better than 2.0.

49. (previously presented) The laser of claim 45, wherein the radiation exiting the cavity has a mode quality of about 1.2.

50. (previously presented) The laser of claim 45, further including a wavelength selective element in the resonator.

51. (previously presented) The laser of claim 50, wherein said wavelength selective element is a birefringent filter.

52. (previously presented) The laser of claim 45, wherein said OPS structure includes a mirror structure surmounted by said gain-structure and said mirror structure is said first mirror.

53. (currently amended) A laser, comprising:

a laser-resonator ~~having a resonator axis and~~ being terminated by first and second mirrors;

an OPS-structure having a surface-emitting gain-structure, said gain-structure including a plurality of active layers having separator layers therebetween said active layers having a composition $In_x Ga_{1-x} N$ where $0.0 \leq x \leq 1.0$, said composition selected to provide emission of electromagnetic radiation at a fundamental wavelength within a gain bandwidth of said gain-structure characteristic of said composition, when optical-pump light is incident on said gain-structure;

said OPS structure being supported on a substrate located outside said laser-resonator with said gain-structure of said OPS-structure being inside said laser resonator;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to oscillate in said laser-resonator; and wherein one of said first and second mirrors is partially transmissive for delivering said laser radiation from said laser resonator.

54. (previously presented) The laser of claim 53, wherein the radiation exiting the cavity has a mode quality of better than 2.0.

55. (previously presented) The laser of claim 53, wherein the radiation exiting the cavity has a mode quality of about 1.2.

56. (currently amended) The laser of ~~claim 45,~~ claim 53, further including a wavelength selective element in the resonator.

57. (previously presented) The laser of claim 56, wherein said wavelength selective element is a birefringent filter.

58. (previously presented) The laser of claim 53, wherein said OPS structure includes a mirror structure surmounted by said gain-structure and said mirror structure is said first mirror.

59. (currently amended) A laser, comprising:

a laser-resonator formed by at least two mirrors;

an OPS-structure having a surface-emitting gain-structure, said gain-structure including a plurality of active layers having separator layers therebetween said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength when optical-pump light is incident on said gain-structure;

said laser-resonator configured to include said gain-structure of said OPS-structure;

an optical arrangement for delivering said pump-light to a substantially single region on said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to circulate in said laser-resonator;

a heat-sink arrangement for cooling said OPS-structure; and

said laser-resonator, said OPS-structure, said heat-sink arrangement and said optical pump-light-delivering arrangement selected and arranged such that said resonator

delivers output-radiation having said fundamental-wavelength at a power greater than 2 W.

60. (previously presented) The laser of claim 59, wherein said resonator is formed by three mirrors.

61. (currently amended) A laser, comprising:

a first OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength between about 425 nanometers and 1800 nanometers when optical-pump light is incident on said gain-structure;

a laser-resonator formed by said mirror-structure of said first OPS-structure and at least two other reflectors, wherein said two other reflectors form a resonator branch segment separate from said OPS structure;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to circulate in said laser-resonator;

a heat-sink arrangement for cooling said first OPS-structure;

an optically-nonlinear crystal located in the resonator branch segment of said laser-resonator and arranged for frequency-doubling said fundamental laser-radiation thereby providing frequency-doubled radiation having a wavelength half of said fundamental-wavelength; and

said laser-resonator, said optically nonlinear-crystal, said OPS-structure, said heat-sink arrangement and said optical pump-light-delivering arrangement selected and arranged such that said resonator delivers said frequency-doubled radiation as output-radiation having a wavelength between about 212 nanometers and 900 nanometers.

62. (previously presented) The laser of claim 61, wherein said laser resonator is formed by said mirror-structure of said first OPS structure and three other reflectors.

63. (previously presented) The laser of claim 62, further including a second OPS-structure having a gain-structure surmounting a mirror-structure, and wherein said mirror structure of said second OPS-structure is one of said three other reflectors.

64. (currently amended) A laser, comprising:

an OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength between about 425 nanometers and 1800 nanometers when optical-pump light is incident on said gain-structure;

a laser-resonator formed by said mirror-structure of said OPS-structure and at least two other reflectors, ~~said laser resonator having a longitudinal axis~~ wherein said two other reflectors form a resonator branch segment separate from said OPS structure;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to circulate in said laser-resonator;

a heat-sink arrangement for cooling said first OPS-structure;

a first optically-nonlinear crystal located in the resonator branch segment of said laser-resonator and arranged for frequency-doubling said fundamental laser-radiation, thereby providing frequency-doubled radiation having a wavelength half of said fundamental wavelength;

a second optically-nonlinear crystal located in the resonator branch segment of said laser-resonator an arranged for mixing said frequency-doubled radiation and said fundamental laser-radiation thereby providing frequency-tripled radiation having a wavelength one-third of said fundamental-wavelength; and

said laser-resonator, said optically nonlinear-crystal, said OPS-structure, said heat-sink arrangement and said optical pump-light-delivering arrangement selected and arranged such that said resonator delivers said frequency-tripled radiation as output-radiation having a wavelength between about 142 nanometers and 600 nanometers.

65. (currently amended) A laser, comprising:

a first OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength between about 425 nanometers and 1800 nanometers when optical-pump light is incident on said gain-structure;

a laser-resonator formed by said mirror-structure of said first OPS-structure and at least two other reflectors, <u>wherein said two other reflectors form a resonator branch segment separate from said OPS structure</u>;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to circulate in said laser-resonator;

a heat-sink arrangement for cooling said first OPS-structure; and

at least a first optically-nonlinear crystal located in <u>the resonator branch segment of</u> said laser-resonator and arranged for frequency-doubling said fundamental laser-radiation.

66. (previously presented) The laser of claim 65, wherein said laser resonator is formed by said mirror structure of said first OPS-structure and three other reflectors.

67. (previously presented) The laser of claim 66, further including a second OPS-structure having a gain-structure surmounting a mirror-structure, and wherein said mirror structure of said second OPS-structure is one of said three other reflectors.

68. (previously presented) The laser of claim 65, including a second optically nonlinear crystal double the frequency of frequency-doubled radiation provided by said first optically nonlinear crystal with said fundamental radiation thereby providing frequency tripled radiation.

Claim 69. (cancelled)

70. (currently amended) A method of selectively irradiating a material having a characteristic absorption band in a spectral region between about 425 and 1800 nm, the irradiation being for one or more of cutting, ablating, heating or photochemically altering the material, the method comprising the steps of:

(a) providing an OPS-laser, said OPS-laser including an OPS-structure having a gain-structure incorporated into a laser resonator, said gain structure including a plurality of active layers having separator layers therebetween, said active layers having a composition selected to provide generation by said laser resonator of fundamental laser-radiation having a wavelength which is within the characteristic absorption band of the material when optical-pump light is delivered to substantially a single region on said gain-structure;

(b) coupling fundamental radiation out of said OPS laser as output-radiation having a power greater than 2 Watts; and

(c) delivering said output-radiation to the material.

71. (previously presented) The method of claim 70, wherein said output radiation is delivered via at least one of a lightguide, an articulated arm, and an optical-focusing system.

72. (previously presented) The method of claim 70, wherein said output-radiation coupled out of the laser is a single axial-mode.

73. (currently amended) A laser, comprising:

an OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength between about 425 nanometers and 1800 nanometers when optical-pump light is incident on said gain-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a reflector spaced apart therefrom~~, said laser resonator having a longitudinal axis~~;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing fundamental laser-radiation having said fundamental-wavelength to oscillate in said laser-resonator;

an optically-nonlinear crystal located in said laser-resonator and arranged for frequency-doubling said fundamental laser-radiation thereby providing frequency-doubled radiation having a wavelength half of said fundamental-wavelength; and

said laser-resonator, said optically nonlinear-crystal, said OPS-structure, and said optical pump-light-delivering arrangement selected and arranged such that said resonator delivers said frequency-doubled radiation as output-radiation in a plurality of transverse modes, said output radiation having a wavelength between about 212 nanometers and 900 nanometers at an output-power greater than about 100 milliwatts.

74. (previously presented) The laser of claim 73, wherein said output-power is greater than 5 Watts.

Claims 75-76. (cancelled)

77. (currently amended) A laser, comprising:

an OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a fundamental-wavelength within a gain-bandwidth characteristic of said active layers when optical-pump light is incident on said gain-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a first mirror spaced apart therefrom~~, said laser resonator having a longitudinal axis~~;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing a beam of fundamental laser-radiation having said fundamental-wavelength to oscillate in said laser-resonator;

an optically-nonlinear crystal located in said laser-resonator said optically-nonlinear crystal having a spectral acceptance range for frequency doubling less than said gain bandwidth and being arranged for frequency-doubling said fundamental laser-radiation thereby providing frequency-doubled radiation having a wavelength half of said fundamental-wavelength,

wherein said laser resonator is folded into first and second portions by a second mirror, said second mirror being transmissive for said frequency doubled radiation and reflective for said fundamental radiation, said first portion of said resonator being between said second mirror and said OPS structure and including a wavelength-selective element configured arranged to prevent fundamental laser-radiation having a wavelength outside of said spectral-acceptance range of said optically nonlinear crystal from oscillating in said laser resonator, and said second portion of said resonator including said optically nonlinear crystal; and

wherein said laser-resonator being configured such that said resonator is forced to deliver said frequency-doubled radiation, via said second mirror, as output-radiation in a plurality of transverse modes.

78. (previously presented) A laser, comprising:

an OPS-structure having a gain-structure surmounting a mirror-structure, said gain-structure including a plurality of active layers having pump-light-absorbing layers therebetween, said active layers having a composition selected to provide emission of electromagnetic radiation at a predetermined fundamental-wavelength when optical-pump light is incident on said gain-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a first mirror spaced apart therefrom, said laser resonator having a longitudinal axis folded into first and second arms by a second mirror located on said longitudinal axis between said mirror-structure of said OPS-structure and said first mirror;

an optical arrangement for delivering said pump-light to said gain-structure, thereby causing a beam of fundamental laser-radiation having said fundamental-wavelength to oscillate in said laser-resonator;

an optically-nonlinear crystal located in said second arm of said laser-resonator between said first and second mirrors and being arranged for frequency-doubling said fundamental laser-radiation thereby providing frequency-doubled radiation in said second arm of said resonator said frequency doubled radiation having a wavelength half of said fundamental-wavelength, and said second mirror being transmissive for said frequency-doubled radiation, whereby said frequency-doubled radiation is delivered from said laser resonator via said second mirror as output radiation; and

wherein said spacing between said second mirror and said mirror-structure of said gain structure is selected such that said resonator is forced to deliver said frequency-doubled output-radiation in a plurality of transverse modes.

79. (previously presented) The laser of claim 78, wherein said frequency-doubled output radiation has a power greater than 100 milliwatts.

80. (previously presented) A laser, comprising:

an OPS-structure having a multilayer gain structure surmounting a mirror-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a spaced apart end mirror, said resonator further including a fold mirror located between said mirror-structure of said OPS-structure and said end mirror;

a diode laser for generating pump light;

at least one lens for focusing the pump light onto the OPS-structure for generating radiation within the resonator at a fundamental wavelength;

a birefringent filter located between the mirror-structure of said OPS-structure and said fold mirror; and

an optically-nonlinear crystal located between said fold mirror and said end mirror for frequency-doubling said fundamental laser-radiation and wherein said fold mirror is highly reflective at the wavelength of the fundamental radiation and at least partially transmissive at the wavelength of the doubled radiation, said fold mirror defining the output coupler for the laser.

81. (previously presented) A laser, comprising:

an OPS-structure having a multilayer gain structure surmounting a mirror-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a spaced apart flat end mirror, said resonator further including a curved fold mirror located between said mirror-structure of said OPS-structure and said end mirror, said resonator having an optical length of at least 5 cm;

a diode laser for generating pump light;

at least one lens for focusing the pump light onto the OPS-structure for generating radiation within the resonator at a fundamental wavelength;

a birefringent filter located between the mirror-structure of said OPS-structure and said fold mirror; and

an optically-nonlinear crystal located between said fold mirror and said end mirror for frequency-doubling said fundamental laser-radiation and wherein said fold mirror is highly reflective at the wavelength of the fundamental radiation and at least partially transmissive at the wavelength of the doubled radiation, said fold mirror defining the output coupler for the laser.

82. (previously presented) A laser as recited in claim 81, wherein the resonator is configured to force multiple transverse mode operation.

83. (previously presented) A laser, comprising:

an OPS-structure having a multilayer gain structure surmounting a mirror-structure;

a heat sink, said OPS-structure being thermally connected to the heat sink, there being a diamond layer positioned between the heat sink and the OPS-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a spaced apart end mirror, said resonator further including a fold mirror located between said mirror-structure of said OPS-structure and said end mirror;

a diode laser for generating pump light;

at least one lens for focusing the pump light onto the OPS-structure for generating radiation within the resonator at a fundamental wavelength;

a birefringent filter located between the mirror-structure of said OPS-structure and said fold mirror; and

an optically-nonlinear crystal located between said fold mirror and said end mirror for frequency-doubling said fundamental laser-radiation and wherein said fold mirror is highly reflective at the wavelength of the fundamental radiation and at least partially transmissive at the wavelength of the doubled radiation, said fold mirror defining the output coupler for the laser.

84. (previously presented) A laser as recited in claim 83, wherein the resonator is configured to force multiple transverse mode operation.

85. (previously presented) A laser as recited in claim 83, wherein the optical length of the resonator is at least 5cm.

86. (previously presented) A laser, comprising:

an OPS-structure having a multilayer gain structure surmounting a mirror-structure;

a laser-resonator formed between said mirror-structure of said OPS-structure and a spaced apart end mirror, said resonator further including a fold mirror located between said mirror-structure of said OPS-structure and said end mirror;

a diode laser for generating pump light;

at least one lens for focusing the pump light onto the OPS-structure for generating radiation within the resonator at a fundamental wavelength;

a birefringent filter located between the mirror-structure of said OPS-structure and said fold mirror; and

an optically-nonlinear crystal located between said fold mirror and said end mirror for frequency-doubling said fundamental laser-radiation and wherein said fold mirror is highly reflective at the wavelength of the fundamental radiation and at least partially transmissive at the wavelength of the doubled radiation, said fold mirror

defining the output coupler for the laser and wherein said resonator is configured to force multiple transverse mode operation.